

COUPP-2L Single Line Power Distribution Diagram Component List and Notes

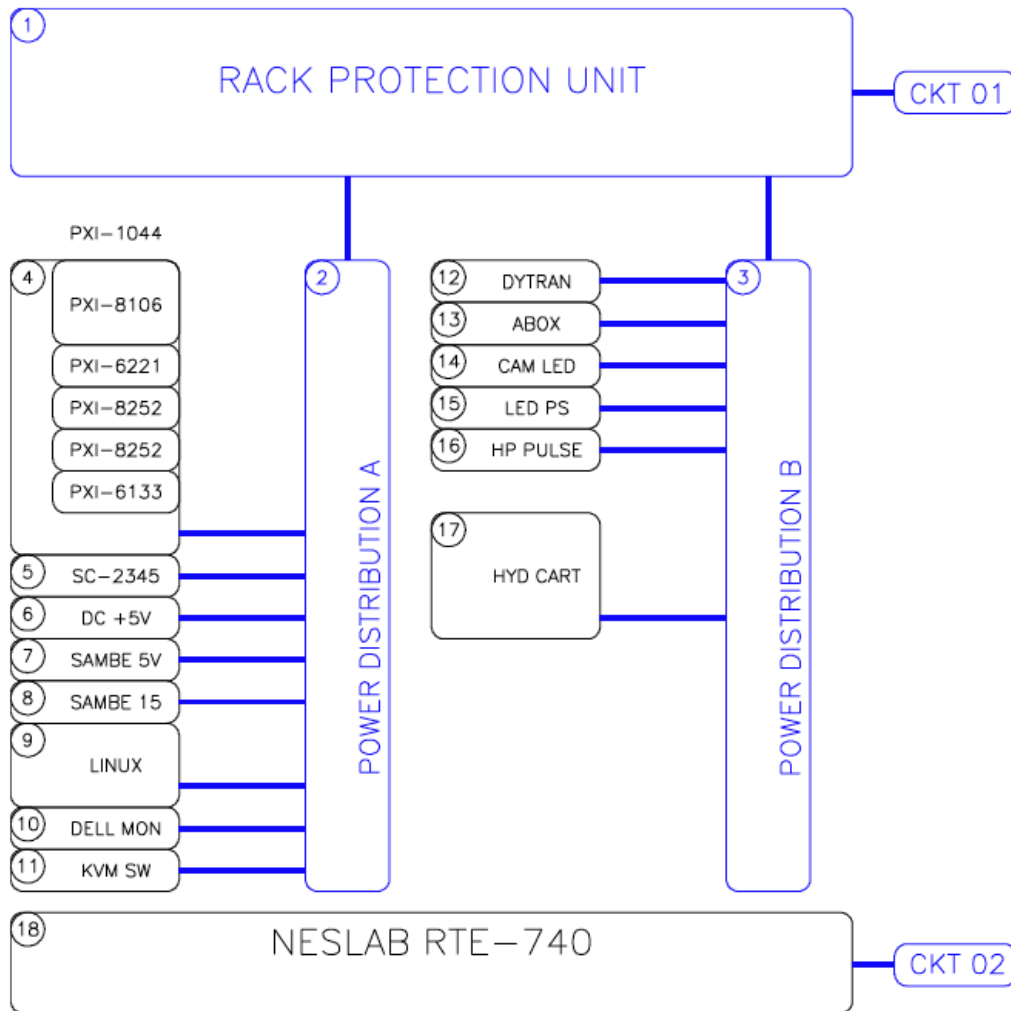


Figure 1: Single Line Electrical Power Distribution Diagram for the COUPP-2L Experiment. All elements 1-17 are contained in a single electronics rack. Item 18 is a self contained NESLAB circulating heater/chiller unit which requires a separate 120V 20A circuit breaker.

item	Description	Manufacturer	UL ¹	C ²	DocDB Link
1	Rack Protection Unit	Fermilab	○	○	Rack Protection
2	Power Strip	TRIPP-LITE	X	X	TRIPP-LITE RS-1215
3	Power Strip	TRIPP-LITE	X	X	TRIPP-LITE RS-1215
4	PXI-1044	National Instruments	X	X	PXI-1044 Chassis
5	SC-2345	National Instruments	X	X	SC-2345 Chassis
6	5V DC Power	LG Electronics	X	X	LG TA-P01WR
7	5V SAMBE Power	LG Electronics	X	X	LG TA-P01WR
8	15V SAMBE Power	ELPAC	X	X	ELPAC FW3024
9	Linux Computer				
10	Dell Monitor	Dell	X	X	DELL Monitor
11	BELKIN KVM Switch	BELKIN	X	X	Belkin SOHO
12	DYTRAN Bias Box	DYTRAN	○	○	DYTRAN Bias Box
13	Acoustic Transducer BIAS Box	Fermilab	○	○	Acoustic Bias Box
14	CAMERA/LED driver box	Fermilab	○	○	LED Driver
15	LED Power Supply	Hewlett Packard	X	X	HP 6023A
16	HP Pulser	Hewlett Packard	X	X	HP 33120A
17	Hydraulic Controls Cart	Fermilab	○	○	Hydraulic Cart
18	NESLAB RTE-740	Thermo Scientific	X	X	NESLAB RTE-740

NOTES:

- 1) *Rack Protection Unit:* This unit was developed for the CDF experiment. It was fabricated and is supported by the Fermilab Particle Physics Division Electrical Engineering Department.
 - a. The unit provides a simple combination of a circuit breaker plus a Smoke detector.
 - b. The unit is fed by a single 120V-20A grounded circuit and provides two 120V-20A grounded outputs with a common 20A breaker.
 - c. The unit contains a small +24VDC power supply to power the smoke detector. The smoke detector circuit will trip the AC output if smoke is detected.
 - d. *The circuit breaker is a manual reset device. This feature should be re-analyzed for SNOLAB use. It may be more appropriate to provide a unit with provision for remote reset.*
- 2) *Power Strip A:* Commercial 12-outlet rack-mount power distribution strip.
- 3) *Power Strip B:* Commercial 12-outlet rack-mount power distribution strip.

¹ Compliant with relevant US Standards

² Compliant with relevant Canadian Standards

- 4) *National Instruments PXI-1004*: This is a commercial PXI chassis with embedded processor and instrumentation modules. The linked National Instrumentation manual is quite complete and includes all pertinent regulatory information.
- 5) *National Instruments SC-2345*: The National Instruments SC-2345 Signal Conditioning Carrier is a commercial instrumentation wiring chassis for interfacing National Instruments Data Acquisition modules to laboratory instruments. Regulatory information is specified in Appendix I of the SC-2345 Carrier User Manual.
- 6) *+5V DC power*: This is a digital logic voltage level supplied by a “wall wart” cell phone charger to the SC-2345 unit. The voltage is internally distributed to provide the logic level voltages for five SCC-DO01 optically isolated digital outputs. These are high impedance logic levels and consume very little current so the use of a very low current, internally protected supply is convenient and safe.
- 7) *SAMBE +5 DC Power*: This is another 5V “wall wart” identical to the (6). It supplies power to a small DC fan on the SAMBE unit.
 - a. *Note: the SAMBE (Switchable Americium Beryllium) source will not be used in the SNOLAB installation of the COUPP-2L Experiment.*
- 8) *SAMBE +15V DC Power*: This is a +15 Volt “wall wart” power supply which supplies power to switch the solenoid on the SAMBE source.
 - a. *Note: the SAMBE (Switchable Americium Beryllium) source will not be used in the SNOLAB installation of the COUPP-2L Experiment.*
- 9) *Linux Computer*: X
- 10) *Dell Monitor*: This is a standard commercial DELL 2408WFP 24 inch flat Panel Display. It is connected to the National Instruments embedded windows processor in the PXI-1044 Data Acquisition Chassis and to the LINUX computer via a BELKIN KVM switch.
- 11) *BELKIN KVM Switch*: This unit is a commercial KVM switch allowing sharing of a single monitor, mouse, and keyboard between the NI data acquisition computer and the LINUX data storage/network access computer.
- 12) *DYTRAN Bias Box*: This is a commercial bias/preamplifier unit designed to operate with the DYTRAN 2005V fast pressure transducer (PT3 in our process flow sheet.)
- 13) *Acoustic Transducer Bias Box*: This is a custom unit designed and fabricated by the Fermilab Particle Physics Division EE Department. It provides the +5 and -5 volt bias voltages for preamplifier boards encapsulated in our acoustic transducer packages (AT1 thru AT4 in the process flow diagram.)

- 14) *CAMERA/LED Interface Box*: This is a custom unit designed and fabricated by Martin Hu of the Fermilab Accelerator Division. This unit interfaces the camera control signals, distributing the camera trigger signal and enabling current flow through the LED array when either camera is active.
- 15) *LED Power Supply*: The CAMERA/LED box provides only switching for the LED drive current. The power supply for the LED array is this external power supply box. The supply is a commercial Hewlett Packard 6023A 0-20 Volt 30A power supply. We use the current limit adjustment on the supply to control the current flow to the LED array. This ISM device complies with Canadian ICES-001.
- 16) *HP Pulse Generator*: This is a commercial Hewlett Packard 33120A arbitrary waveform generator used (or *misused*...) to provide the 100 Hz clock signal to synchronize our cameras.
- 17) *Hydraulic Controls Cart*: The hydraulic controls cart is a custom unit designed and fabricated by the Fermilab Particle Physics Division Technical Centers Department. From an electrical standpoint, it is a simple box containing an Automation Direct PLC unit along with a motor controller and instrumentation wiring.
- 18) *NESLAB RTE-740*: This is a commercial circulating heater/chiller unit.